Quantifying the Total Cost of Upgrading HP OpenVMS AlphaServer systems to OpenVMS on HP Integrity servers

A Detailed Analysis of the Potential Benefits of Upgrading OpenVMS environments from HP AlphaServer systems to HP Integrity servers

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Upgrades from OpenVMS AlphaServer to OpenVMS on HP Integrity servers

Executive Summary

For over a decade companies in a wide variety of industries have deployed OpenVMS AlphaServer systems in business-critical applications. Many studies have proven that OpenVMS AlphaServer systems offer superior reliability and Total Cost of Ownership. HP will shortly stop selling AlphaServers, however, in favor of its Integrity server product line. This paper provides a detailed Total Cost of Upgrade™, or TCU™, analysis for upgrading OpenVMS AlphaServer systems to OpenVMS Integrity systems. It quantifies the costs and benefits from the upgrade and provides detailed cash flow analyses for four upgrade and two consolidation scenarios. **The analysis shows that in many cases companies cannot afford not to upgrade from AlphaServer to Integrity. In some of the scenarios studied the payback period is so short that it is measured in months, not years.**

TechWise Research conducted in-depth interviews with 46 companies, utilized system pricing data from IDEAS International, and obtained performance data from HP for the analyses. The analysis discovered **several benefits to the upgrade including reduced HP support costs, reduced power consumption, improved performance, opportunities for consolidation, potential floor space savings, reduced Oracle support costs, and the latest technology**. Specifically, the prices HP charges for hardware and software support on Integrity are much lower than the out-of-warranty costs for AlphaServers. In addition, the Integrity servers are much more efficient in terms of power than AlphaServer systems. Almost all of the scenarios studied result in a 50% or greater reduction in power use. The newer Integrity servers often offer twice the performance of the older AlphaServer systems. This means the Integrity servers will be running at a lower CPU utilization which will allow for future growth. This performance advantage also means that customers could consolidate multiple AlphaServer systems into fewer Integrity servers. Whether or not a company is consolidating servers, upgrading to Integrity often yields floor space savings because Integrity servers fit in standard racks while many AlphaServers require custom enclosures. Thanks to Oracle's treatment of the dual-core Montecito chips in Integrity, companies can cut their Oracle support costs in half by upgrading from AlphaServer to Integrity. Finally, the upgrade makes strategic sense. Moving from AlphaServer to Integrity means that the company's infrastructure will be based on current technology that will continue to improve in price and performance.

Each company will face a unique decision when it comes to upgrading from AlphaServer to Integrity. The age-old adage of *"if it ain't broke, don't fix it"* may not apply in most cases. HP has taken steps to make the upgrade decision easier by offering free software upgrades to OpenVMS Integrity for OpenVMS AlphaServer customers with appropriate support contracts. HP also made it easy to port well-behaved custom code. Custom applications may only need a simple recompile and relink to run on OpenVMS Integrity. This is because the OpenVMS source code and libraries are the same for AlphaServer and Integrity. OpenVMS AlphaServer systems have been shown to offer superior reliability and Total Cost of Ownership. **This study shows that OpenVMS on Integrity is just as easy to manage and reliable as OpenVMS on AlphaServer.** Any company that plans on using OpenVMS for the foreseeable future would be wise to look into upgrading to Integrity. **The upgrade has the potential to pay for itself quickly, lower annual support and operating costs significantly, and improve system performance dramatically**.

Brief History of OpenVMS

The OpenVMS operating system was first introduced nearly 30 years ago on October 25, 1977 when Digital Equipment Corporation introduced the first VAX system. Since that time, many technical advances were made to the operating system as well as the server hardware. The 1983 introduction of the VMS cluster technology, combined with the 1985 introduction of the MicroVAX II platform, greatly expanded the system's popularity. More than one-half million VAX systems were sold during its 23-year life. However, like all computing architectures, the VAX could not remain on the leading edge of technology forever. This is why Digital developed a new hardware platform for the OpenVMS operating system.

The 64-bit Alpha architecture became the eventual successor to the 32-bit VAX architecture. Digital introduced the first Alpha system in 1992 and the first AlphaServer systems in 1994. Digital's initial plan was to maintain and enhance the AlphaServer product line for 25 years. This plan was cut somewhat short when in 2001 Compaq Computer, which had purchased Digital, announced that Alpha would be phased out by 2004 in favor of Intel's Itanium platform. HP, which purchased Compaq later the same year, announced that development of the Alpha series would continue for a few more years. The final three AlphaServer models (ES47, ES80, and GS1280) have long since been introduced and sometime this year HP will likely stop selling AlphaServer systems. HP is not, however, abandoning OpenVMS or its AlphaServer installed base. Rather HP has made a commitment to continue support for OpenVMS AlphaServer until at least 2012.

The successor to the AlphaServer is the HP Integrity, a family of servers based on the 64-bit Itanium 2 microprocessor. HP introduced the first Itanium 2 servers in 2002, which were rebranded as HP Integrity servers in 2003. HP Integrity servers began supporting the OpenVMS operating system in January of 2005 with the introduction of OpenVMS version 8.2. To date, over 950 applications have been ported to OpenVMS on Integrity with many hundreds more in the works. HP took steps to make the transition from AlphaServer to Integrity as easy as possible for software developers. Perhaps the most important step was ensuring that the Alpha and I64 (Itanium) versions of OpenVMS are built and maintained using a common source code library and common tools. As a result, many OpenVMS Alpha applications may only require a simple recompile and relink to run on OpenVMS Integrity.(2)

Numerous studies, including several by TechWise Research(3), have quantified the reliability of the AlphaServer platform and OpenVMS environment. Customers can count on their current AlphaServer systems to continue to function reliably for many years into the future. Furthermore, HP will continue to support OpenVMS AlphaServer for at least the next five years. How then could it possibly make sense for customers to upgrade their AlphaServer systems to Integrity servers at this time? Shouldn't the age-old adage of *"if it ain't broke, don't fix it"* apply? In some cases it will not make sense to upgrade from an AlphaServer to an Integrity server environment. This paper, however, will show that for most customers the decision to upgrade from OpenVMS AlphaServer to OpenVMS Integrity is a sound one, from both financial and strategic perspectives.

(1) Note: This paper focuses exclusively on OpenVMS AlphaServer to OpenVMS Integrity upgrades. All subsequent references to AlphaServer and Integrity are specific to the OpenVMS operating system.
(2) Much of the historical data comes from Wikipedia, the free encyclopedia.
(3) Total Cost of Ownership white papers, TechWise Research, various dates.

Data Collection Strategy

In order to perform a robust Total Cost of Upgrade™ (TCU™) analysis, TechWise Research needed to speak with customers who are using OpenVMS on Integrity servers. This is the only way to objectively measure, for instance, how easy or difficult it is to install the new Integrity server. TechWise conducted in-depth telephone interviews with 17 different companies that have added at least one Integrity server to their OpenVMS environment. All 17 companies were screened to ensure that (1) the Integrity server was added to an existing OpenVMS AlphaServer cluster, and (2) the cluster was running in production mode. These requirements allowed TechWise to replicate the real world market, as explained below.

There are two primary reasons why TechWise only interviewed companies with Integrity servers in *OpenVMS production clusters* (as opposed to stand-alone Integrity servers). Numerous studies have shown that AlphaServer systems are extremely reliable and that they typically run for many years without a single crash or hardware problem. In fact, TechWise has found that in the absence of a natural disaster or extremely hostile work environment (such as in a steel mill), AlphaServer systems rarely fail. When HP finally stops supporting AlphaServer systems (which will not happen until at least 2012), hundreds of thousands of AlphaServer systems will still be in deployment and will continue to be used for many years. Integrity and AlphaServer systems, therefore, are going to co-exist for many years into the future. The harshest test of how well the two platforms will co-exist would be to see how they perform together in a server cluster because they would be physically linked together to provide automated failover and/or parallel processing. If AlphaServer systems and Integrity servers can co-exist in a cluster, then they can also co-exist as stand alone servers. TechWise focused on production clusters (as opposed to test clusters) because these clusters are being used in real world applications where issues such as downtime are critically important. In addition to these 17 companies, TechWise interviewed another 29 companies with "pure" OpenVMS AlphaServer clusters (i.e., no Integrity servers) to collect updated information on AlphaServer management costs and reliability.

TCU Scenarios Analyzed

Every customer has a unique installation when it comes to the number and type of OpenVMS AlphaServer systems. Furthermore, for every conceivable combination of AlphaServer systems, there are several potential upgrade paths. Some could include a one-for-one exchange where a single AlphaServer is upgraded to a single Integrity server. Others could involve a consolidation where multiple Alpha-Servers are upgraded to a fewer number of Integrity servers. The chart to the right summarizes the four one-for-one upgrade scenarios that were analyzed for this paper. These scenarios were selected based on customer interviews and

Configurations of the Four One-for-One Scenarios Used in TCU Analysis

	Original AlphaServer Configuration	Upgraded Integrity Server Configuration
#1	AlphaServer DS25 1GHz 2 chips (2 total cores) 2GB RAM	Integrity rx2660 (2U) 9020 1.4GHz 12MB 1 chip (2 total cores) 2GB RAM
#2	AlphaServer ES47 (4U) 1150MHz 4 chips (4 total cores) 16GB RAM	Integrity rx3600 (4U) 9020 1.4GHz 12MB 2 chips (4 total cores) 16GB RAM
#3	AlphaServer ES80 1150MHz 8 chips (8 total cores) 16GB RAM	Integrity rx6600 (7U) 9040 1.6GHz 18MB 4 chips (8 total cores) 16GB RAM
#4	AlphaServer GS1280 1300MHz 1.75MB 32 chips (32 total cores) 128GB RAM	Integrity rx8640 (17U) 9020 1.42GHz 12MB 16 chips (32 total cores) 128GB RAM

Note: All eight systems were configured with 146 GB of external storage and licenses for OpenVMS.

TechWise Research, Inc.

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TechWise Research's market knowledge. The first scenario involves upgrading an entry-level AlphaServer DS25 to an Integrity rx2660. The second and third scenarios involve upgrading midrange AlphaServer ES47 and ES80 systems. The final scenario involves upgrading an enterprise-class AlphaServer GS1280 to an Integrity rx8640. Note that all of the Integrity servers use the dual-core Montecito processor, so that every chip acts like two separate cores. This can be an important point in determining third-party software support costs, as will be shown later.

TechWise Research also analyzed two different scenarios of OpenVMS AlphaServer to OpenVMS Integrity server consolidations. The first involves consolidating three AlphaServer ES80s into a single Integrity rx7640. The second involves consolidating five Alpha-Server ES45s into three Integrity rx3600s. The chart to the left summarizes the details of the configurations in these consolidation scenarios.

Configurations of the Two Server Consolidation Scenarios Used in TCU Analysis

	Original AlphaServer Configuration	Upgraded Integrity Server Configuration
#5	Three AlphaServer ES80 1150MHz servers Each server has 8 chips (8 cores) Each server has 16GB RAM Total of 24 chips (24 cores) and 48GB RAM	One Integrity rx7640 (10U) 1.6GHz 9040 with 8 chips (16 total cores) and 64GB RAM
#6	Five AlphaServer ES45 68/1250 Each Server has 4 chips (4 cores) Each server has 14 GB RAM Total of 20 chips (20 cores) and 70GB RAM	Three Integrity rx3600 (4U) 1.4GHz 9020 Each server has 2 chips (4 cores) Each server has 16GB RAM Total of 6 chips (12 cores) and 48GB RAM

Note: All systems were configured with 146 GB of external storage and licenses for OpenVMS.

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The next section of this white paper explains the approach TechWise Research used to develop its TCU model. It includes a discussion of the various factors involved in the upgrade decision and how TechWise addressed them in the analyses. The final part of the white paper includes the actual results of the TCU analyses for the six different upgrade scenarios just described.

The Two Sides of the TCU Equation

There are two sides to the equation TechWise Research developed to quantify the total cost of upgrading an OpenVMS AlphaServer system to an OpenVMS Integrity system. These are the upfront costs and ongoing savings associated with the upgrade.

Upfront Costs

- **Integrity Server:** The cost to purchase the Integrity server configured with the desired amount of memory and storage.
- **Operating System:** The cost to acquire the license for OpenVMS on Integrity.
- **Third-Party Software:** The cost to transfer licenses of any third-party application from OpenVMS AlphaServer to OpenVMS Integrity.
- **Custom Applications:** The cost to port custom applications to OpenVMS Integrity.
- **Installation**: The time and/or money spent installing the new Integrity server.
- **Training:** The time and/or money spent learning how to use the new Integrity server.

All of the preceding factors are one-time costs companies would pay at the beginning of the upgrade process. In addition to these costs, the fully functional AlphaServer that would be replaced has a residual value that should be included in the TCU analysis. Companies have two options for trading-in their AlphaServer systems. First, they can contact a reseller such as *Arrow Electronics* out of Melville, New York or *Total Tec Systems* out of Edison, New Jersey. These resellers will work directly with HP to obtain a credit for the AlphaServer that can be applied to the Integrity purchase. In addition, companies can contact firms like *The Newman Group* out of Dexter, MI that purchase used AlphaServer systems directly. All three sources provided residual values for the AlphaServer systems in the six scenarios. TechWise compared these residual values and used a conservative average (i.e., low value) in the TCU calculations.

In addition to the residual value of the AlphaServer, there are several potential sources of ongoing cost savings once the OpenVMS Integrity server is up and running in production.

Potential Ongoing Savings

- **Support Contracts:** This is the difference, if any, between the cost of a support contract on the AlphaServer versus the Integrity server.
- **Management Costs:** This is the difference, if any, in the time and costs spent managing the servers on an ongoing basis.
- **Energy Costs:** This is the difference, if any, in the ongoing power and cooling costs between the AlphaServer and Integrity server.
- **Floor space:** This is the difference, if any, in the floor space requirements of between the AlphaServer and Integrity server.

The following sections explain our approach to quantifying all of the cost/benefit factors listed above for our TCU model.

Up-Front Costs Associated with an Upgrade

In terms of the cost for the new Integrity servers, TechWise Research obtained current system and service pricing from IDEAS International. IDEAS International is recognized worldwide as a leading authority on systems technology, specializing in the research of comparative information on computer systems. Their current system and service pricing is updated daily with new product and price announcements. When buying servers, two customers can pay very different prices for two identical servers depending on when they buy them, and on the level of discount they can negotiate from their channel. In order to eliminate any timing or purchasing power bias from the analyses, TechWise used current list prices from IDEAS International. Few companies, however, pay list price for their servers. Our approach, therefore, is very conservative because it includes system pricing that is higher than what most companies would actually pay.

The cost to license the OpenVMS operating system for an Integrity server can run in the tens of thousands of dollars, depending on the system configuration and type of license. However, for many customers upgrading from AlphaServer to Integrity this cost will be zero. This is because of a program HP introduced to encourage this upgrade path. In a document entitled "*Business practices for HP OpenVMS on HP Integrity servers*", HP addresses the migration from OpenVMS on AlphaServer systems to OpenVMS on HP Integrity servers. This policy states that if a customer has a support contract for its OpenVMS license that entitles them to

new versions, they may trade their OpenVMS AlphaServer license in for an equivalent OpenVMS Integrity license at no charge. Customers who do not have a support contract with HP for their OpenVMS license may purchase an equivalent OpenVMS Integrity license at a 60% discount. Most of the OpenVMS AlphaServer customers that TechWise has interviewed in the past 2 years have a support contract with HP. For this reason, TechWise assigned a zero cost for the OpenVMS Integrity license in the TCU analysis. Companies that are not sure of their OpenVMS support status should contact their reseller or HP directly to clarify their particular situation.

In terms of third-party applications, there are literally hundreds of applications available for OpenVMS. As previously noted, as of April, 2007 HP stated over 950 applications are generally available for OpenVMS on HP Integrity servers. Each software vendor will have their own policy regarding a customer switching from AlphaServer to Integrity. Since every company has a unique set of applications, the only way to get an exact measurement of these costs is for the company (or a third-party) to contact all of their software vendors and obtain the upgrade costs. For this paper, TechWise looked at the following four applications: Oracle Server, Oracle Rdb, BEA MessageQueue, and IBM WebSphere MQ. These are some of the most popular third-party applications among OpenVMS users. It is our understanding that as long as a customer has a support contract with their respective software vendor, they can transfer their license to OpenVMS Integrity at no cost. This is the assumption that we used in the TCU model. On another note, it is possible for companies to save significant dollars in software support costs as a result of the upgrade. This benefit is explained in more detail in the following section.

Many OpenVMS users have written custom code for their servers. In a previous study TechWise Research interviewed 62 different companies to quantify the costs associated with the upgrade from VAX to AlphaServer. Many of the companies surveyed indicated they had between 250,000 and 1,000,000 lines of custom code. Most of these same companies found the process of porting their custom code from VAX to Alpha to be relatively easy, despite the fact that over time the source code for OpenVMS VAX and OpenVMS Alpha diverged. The process of porting custom code from AlphaServer to Integrity should be even easier. This is because HP ensured that the Alpha and I64 (Itanium) versions of OpenVMS are built and maintained using a common source code library and common tools. As a result, many OpenVMS Alpha applications will only require a simple recompile and relink to run on OpenVMS Integrity. Of course, not all applications will port over this easily. For the purposes of this paper, however, TechWise assumed the only costs associated with custom applications are for simple recompiles.

Finally, the Integrity is a different platform than the AlphaServer. Companies making this transition for the first time can expect to spend some time installing the new Integrity and learning how to use it. One of the goals of the customer interviews was to collect customer feedback about the process of configuring an Integrity server. Almost all of the respondents were long-term OpenVMS users who had little to no experience with the Integrity platform. From these respondents we learned that an IT Manager should expect to spend a few hours becoming familiar with the Integrity platform. In addition, the console that is used to install the operating system on Integrity is not as user-friendly as the one that is used on AlphaServer. These two issues, however, have a very minor impact on the Total Cost of Upgrading. The worst case scenario was to spend a day becoming familiar with Integrity and installing the OpenVMS operating system (versus an hour for a new AlphaServer).

Ongoing Savings Resulting from an Upgrade

Support contracts represent one area where companies can save a significant amount of money by upgrading AlphaServer systems to Integrity servers. This is not surprising because "next generation" computing equipment almost always offers higher performance at a lower price than the equipment it replaces. Since service contract costs are typically directly proportional to system price, it stands to reason that service costs for Integrity (next generation) servers would be lower than service costs for comparable AlphaServer systems. How big an issue is this? The annual cost for a hardware and software service contract on an out-of-warranty AlphaServer ES80 is approximately $27,000. The same contract on a new Integrity rx6600 would cost $7,000 on an annual basis. **This means a company can save $20,000 a year, every year, in support contract costs by upgrading an ES80 to an rx6600.** TechWise Research contacted HP for the annual out-of-warranty support costs for the six AlphaServer systems analyzed in this paper.

One of the big unknowns going into this study was how Integrity servers running OpenVMS compare to AlphaServer systems running OpenVMS in terms of reliability and management costs. Although reliability is not factored into this TCU analysis from a financial perspective, it is critically important in the decision to upgrade. AlphaServer systems are usually deployed in business critical situations where the cost for an hour of downtime is very high. In previous studies AlphaServer systems have consistently proven to be very reliable systems. If Integrity servers were noticeably less reliable than AlphaServer systems, it would make little sense for companies to consider the upgrade. In terms of management, a complete TCU analysis should account for any differences in the time required to manage both types of servers.

During the customer interviews TechWise Research collected information about the number of times, if any, the servers have gone down and the duration of the downtime. A key finding from this data is that the hardware reliability of the Integrity servers is just as good as the reliability of the AlphaServer systems. The data also shows that OpenVMS is just as reliable when running on Integrity as it is when running on AlphaServer. This finding is no doubt due in large part to HP's decision to build and maintain the Alpha and I64 (Itanium) versions of OpenVMS on a common source code library and common tools In terms of management, almost all of the respondents stated that once the servers are configured and up and running, there is no difference between running OpenVMS on Integrity and OpenVMS on AlphaServer. One respondent said that when he is working on a console he cannot tell which system he is accessing unless he intentionally digs for the information. The data further shows that on a per server basis, respondents spend the same amount of time on a weekly basis managing and maintaining their Integrity servers as they spend on their AlphaServer systems.

For the first time ever TechWise Research has added energy costs into its TCU analysis. Thanks to the ever increasing cost of energy, the cost to run a server and cool the server room can no longer be ignored. According to Bart Perkins of ComputerWorld, "in some markets, the electricity bill for a server facility can run four to six times the cost of renting the building space." Furthermore, energy conservation has become a politically charged topic, with many corporations taking steps to be a "green company." For these reasons, TechWise looked at the differences in power consumption and cooling requirements between AlphaServer and Integrity. The analysis shows that in all but one case, the Integrity

server uses significantly less energy than the AlphaServer it would replace. The table to the right shows that these savings can result in a 50% or more reduction in energy usage. Energy costs vary across the country. In order to include power in the TCU analysis, TechWise applied a rate of $0.093 per kilowatt to calculate the energy savings.

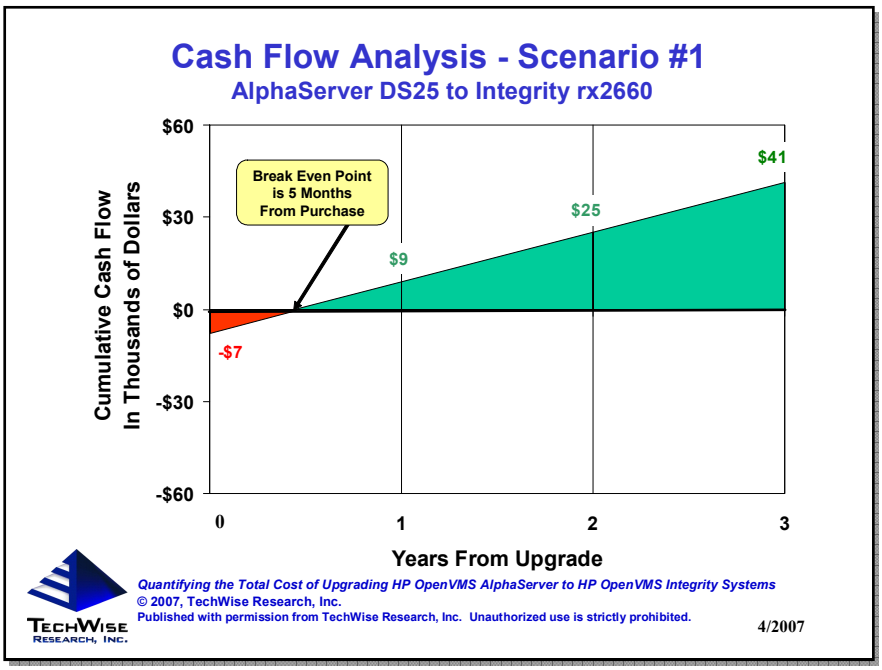
Power and Cooling Requirements Comparison Expressed in Kilowatt Hours

Upgrade Scenario	AlphaServer	Integrity	Percent Change
DS25 - rx2660	1.09 kWh	1.13 kWh	**+3%**
ES47 - rx3600	3.38	1.39	**-59%**
ES80 - rx6600	11.79	1.99	**-83%**
GS1280 - rx8640	15.12	7.73	**-49%**

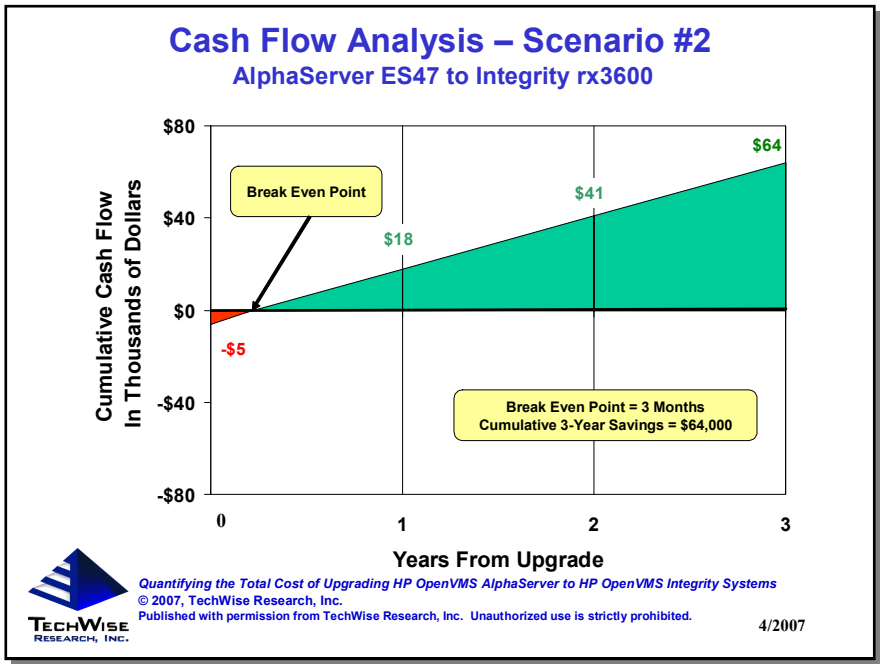
Floor space is a much more difficult factor to quantify in a formula. This is because the upgrade from AlphaServer to Integrity will have different impacts on floor space depending on the layout and utilization of the server room. All of the Integrity servers analyzed in this paper are rack mountable in a standard rack. The AlphaServer systems, on the other hand, are either pedestal based or come in their own custom enclosure. Companies that have open slots in their racks could free up floor space by upgrading from AlphaServer to Integrity. However, it is difficult to quantify the resulting savings because the value of a square foot of floor space in Manhattan is very different than in Omaha. For this reason, floor space savings were not included in the financial calculations.

Cash Flow Analysis for One-for-One Upgrades

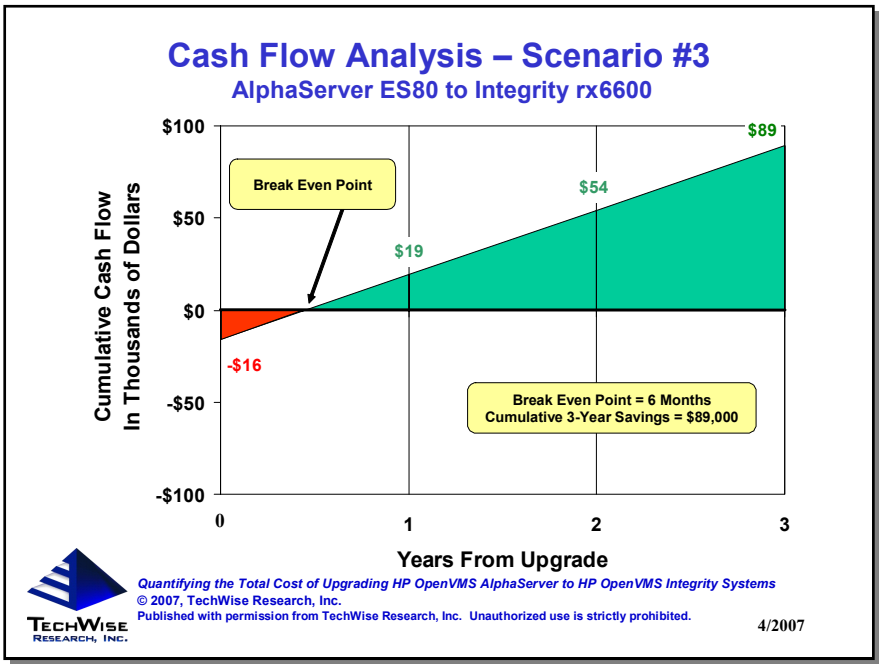
In Scenario #1, an entry-level AlphaServer DS25 is upgraded to an Integrity rx2660. This model of Integrity server offers more than twice the performance of the AlphaServer DS25. The total start-up costs for this upgrade is only $7,000. This low figure is the result of the residual value of the AlphaServer DS25. Note, for all of these calculations it is assumed that the AlphaServer is traded in at the same time as the Integrity server is purchased. This is why the start-up costs are less than the list prices of the Integrity server itself. This upgrade, although neutral in terms of power costs, offers a ***reduction in service costs that pays for the new hardware in only 5 months***. The chart to the left shows the cumulative cash flow for the first three years after the upgrade. It shows that at the end of three years, the net savings from this upgrade are $41,000. This means that the upgrade paid for itself and still had enough savings to purchase another 3 rx2660 servers.



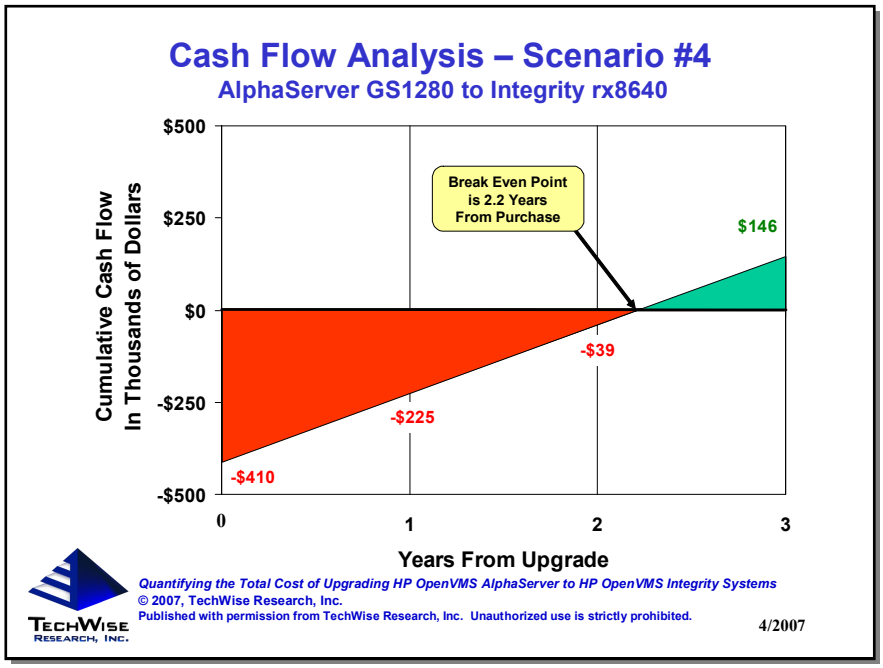
The financial analysis of the second upgrade is even more compelling, as illustrated in the chart below. ***Upgrading an AlphaServer ES47 to an Integrity rx3600 pays for itself in just three months***! The Integrity rx3600 offers nearly twice the performance of the AlphaServer ES47. In addition, this upgrade will reduce the electricity bill by nearly 60% thanks to the lower power and cooling requirements of the rx3600. Over a three-year period the total net savings from this upgrade after the purchase of the Integrity are $64,000.



There is also a very compelling story to upgrade the midrange AlphaServer ES80. The ***Integrity rx6600 uses an astounding 83% less energy than the AlphaServer ES80***! This will result in significant power savings for many years into the future. The ES80, being a relatively new midrange server, has a fairly high residual value. This helps reduce the initial cost of this upgrade to only $16,000. As the chart to the left shows, the break-even point is reached in only 6 months and the cumulative three-year net savings are $89,000. In all three of the scenarios analyzed so far, the upgrade pays for itself in less than a year. IT Managers should find it relatively easy to justify these upgrades on a financial basis because they result in a positive affect on cash flow in the same year as the purchase.

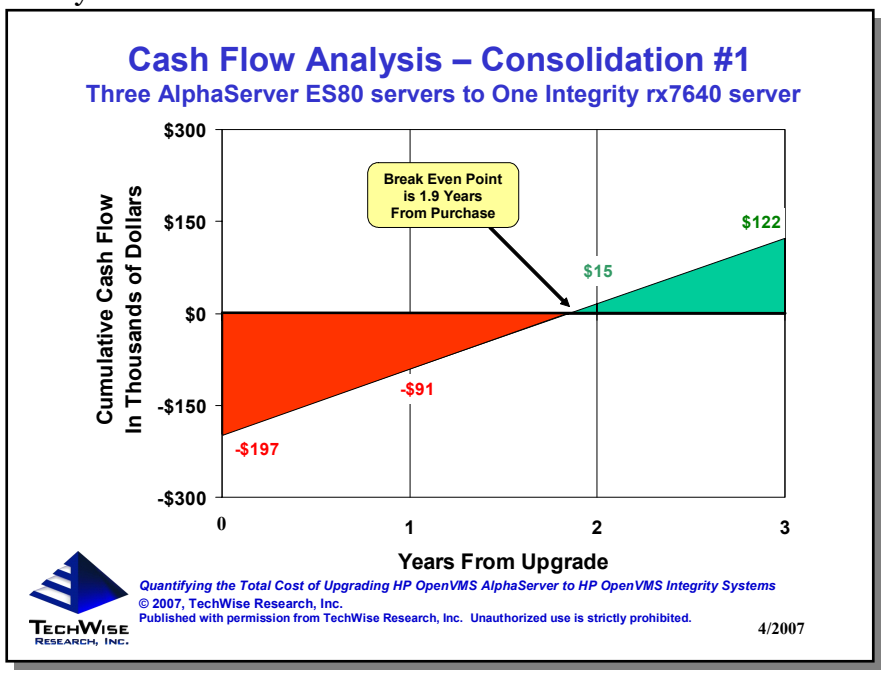


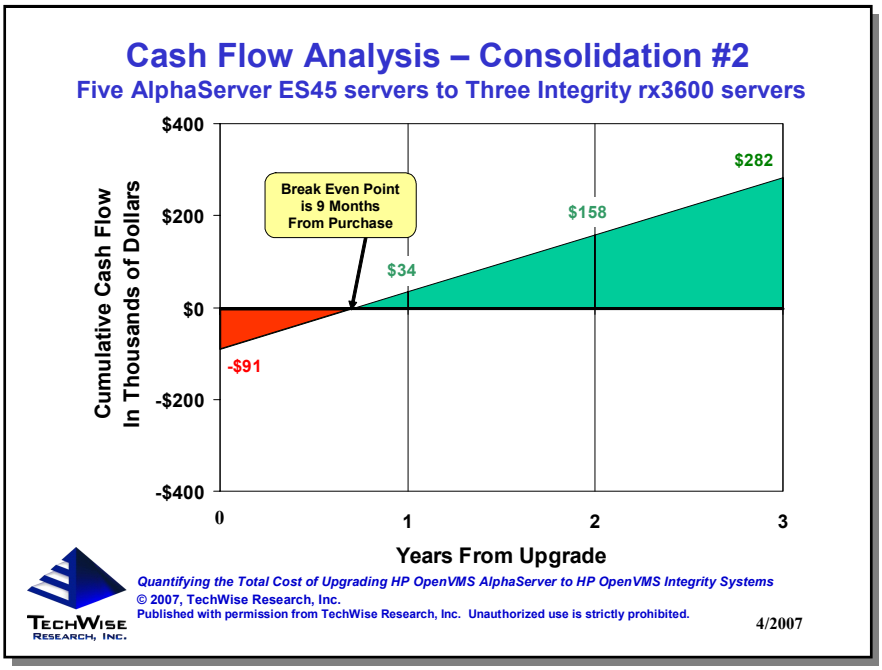
The final scenario involves upgrading the top-of-the-line AlphaServer GS1280 to the Integrity rx8640. This Integrity server is a very high-end machine that is just one notch below the Superdome product. The rx8640's performance is only slightly higher than the GS1280. The system price of Integrity server, however, is 75% lower than the price of the AlphaServer system. The rx8640 still represents a substantial purchase that would normally exceed half a million dollars if it wasn't for the trade-in value of the GS1280. The rx8640 runs on 49% less energy than the GS1280, which can save $500 or more a month in energy and cooling costs. The chart to the right shows that the break-even point for this upgrade is at 2.2 years. Companies that have made a long-term commitment to OpenVMS, however, would be wise to consider this upgrade. These systems have a longer useful life than entry-level and midrange servers. **Over a five-year period (not shown in graph) the upgrade would pay for the price of the rx8640 and save an additional $516,000**. These cumulative net savings would be enough to purchase a second Integrity rx8640.



Cash Flow Analysis for Server Consolidations

The first scenario involves consolidating three AlphaServer ES80 systems into one Integrity rx7640 server. Despite the reduction in the number of servers from three to one, the single rx7640 will deliver a 25% increase in performance over the three ES80s. In addition, ***the single rx7640 would use 88% less power than the three ES80s***. This results in a monthly savings of over $2,000 when energy costs 9.3 cents per kilowatt hour. The rx7640 costs over $300,000 with three years of hardware and software support. As the chart to the right shows, this initial cost is nearly cut in half due to the trade-in value of the three ES80s. This consolidation breaks even after 1.9 years. After three years, the net cumulative savings from this consolidation are $122,000. Although space savings are not included in any of the TCU analysis, it is worth noting that in this upgrade the three ES80 servers would typically reside in three separate racks (although they could be in two). So this upgrade will eliminate at least one, if not two, racks from the server room.





The final scenario involves consolidating five AlphaServer ES45s into three Integrity rx3600. **This consolidation pays for itself in only 9 months, and would go on to save an extra $282,000 over a three-year period.** The three rx3600s run on 73% less energy than the five ES45s.

Oracle Users Have a More Compelling Reason to Upgrade

As previously mentioned, upgrading to Integrity could also lead to savings on third-party software support contracts. Every software company has a different pricing policy for their support contracts. Previous studies conducted by TechWise have shown that sixty percent or more of OpenVMS AlphaServer systems are running Oracle Server or Oracle Rdb. For this reason, TechWise Research investigated the impact of upgrading OpenVMS AlphaServer to OpenVMS on HP Integrity servers on Oracle support costs. TechWise used Oracle's March 2, 2007 Global Price List, which is posted on its website, for the analysis. Note that the prices listed in Oracle's document are for educational purposes only and are subject to change at any time. The current price for an annual support contract from Oracle that provides support and updates is $8,800 *per processor*. The newer Integrity servers all use the dual core Montecito chip. For the purposes of license fees, Oracle treats each Integrity core as 0.5 of a processor. Because of this, every upgrade will result in a reduction in Oracle's annual support costs.

How much can companies save in Oracle support costs? The AlphaServer DS25 upgrade reduces the number of licenses by 1 while the AlphaServer ES47, AlphaServer ES80, and AlphaServer GS1280 upgrades reduce the number of licenses by 2, 4, and 16, respectively. **This translates into additional annual savings of $8,800 (DS25), $17,600 (ES47), $35,200 (ES80), and $140,800 (GS1280)**. The two server consolidations would also result in a significant reduction in support costs. In the first server consolidation example, three ES80s with 8 processors each are consolidated into a single rx7640 with 8 processors. The dual core processors on the Integrity server makes it behave as if it has 16 processors. However, Oracle's support contract will consider the server to have 8 CPUs. This consolidation, therefore, reduces the number of CPUs by 16 (=3 x 8 - 8) which translates into annual savings of $140,800! The second server consolidation example results in a reduction of 14 CPUs for an annual savings of $123,200.

The table to the right shows the impact of Oracle support costs on the break-even point for all six scenarios studied. **It shows that in many cases the additional savings in annual Oracle support costs cuts the time for the upgrade to break-even in half**. In all but one scenario, the upgrade pays for itself in less than a year. Companies that run Oracle on OpenVMS AlphaServer systems can save tens to hundreds of thousands of dollars a year by upgrading to OpenVMS on HP Integrity servers.

Impact of Oracle Support Costs on Break-Even Point for Upgrades and Consolidations

	Upgrade Scenario	Original Break-Even	Break-Even with Oracle Savings
#1	AlphaServer DS25 to Integrity rx2660	5 months	3 months
#2	AlphaServer ES47 to Integrity rx3600	3 months	2 months
#3	AlphaServer ES80 to Integrity rx6600	6 months	3 months
#4	AlphaServer GS1280 to Integrity rx8640	2.2 years	1.3 years
#5	Three AlphaServer ES80 to One Integrity rx7640	1.9 years	10 months
#6	Five AlphaServer ES45 to Three Integrity rx3600	9 months	4 months

Note: Analysis based on Oracle's March 2, 2007 Global Price List.

TechWise Research, Inc.

Quantifying the Total Cost of Upgrading HP OpenVMS AlphaServer to HP OpenVMS Integrity Systems

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Conclusion

This study focused on quantifying the costs and benefits associated with upgrading various OpenVMS AlphaServer systems to OpenVMS Integrity systems. A detailed cash flow analysis was performed on four different upgrade scenarios and two different server consolidation scenarios. A variety of factors were included in this TCU analysis: the list price of the new Integrity systems, current service pricing for Integrity and AlphaServer systems, start-up costs associated with the installation of the new Integrity system, the residual value of the AlphaServer, Oracle support costs, and differences in power consumption.

One key finding from the customer surveys is that **there is no difference in reliability or management costs between OpenVMS AlphaServer and OpenVMS Integrity**. The Integrity hardware platform has the same reliability as AlphaServer and did not require any additional time to manage on a week to week basis. Once the Integrity system was configured and installed in an OpenVMS cluster, it was difficult to distinguish between it and the AlphaServer nodes. This is no doubt due in large part to HP's decision to have OpenVMS AlphaServer and OpenVMS Integrity share the same common source code and libraries.

Another major finding is that **upgrades or consolidations involving Integrity servers often pay for themselves in less than a year**. Companies that focus strictly on annual IT budget expenditures will find these upgrades attractive on a financial basis. Even the scenario with the Integrity rx8640, the highest-end Integrity server studied, paid for itself in just over two years. This is amazing given that the rx8640 costs over half a million dollars. Clearly the upgrade from OpenVMS AlphaServer to OpenVMS Integrity results in substantial savings.

Two unexpected benefits were also found. First, in all but one scenario **upgrading from OpenVMS AlphaServer to OpenVMS Integrity resulted in a very significant reduction in power consumption, typically a 50% or more reduction.** Besides the obvious energy savings, these upgrades can be viewed as environmentally friendly decisions. Second, **companies that use Oracle Server or Oracle Rdb can save tens of thousands of dollars a year in software support costs**. In many cases the additional savings in Oracle support costs cuts the break-even time in half.

There are some cases where upgrading is not advisable. Companies that run a considerable amount of custom code may find the porting from AlphaServer to Integrity to be expensive if their code is not "well behaved." Although over 950 commercial applications have ported to OpenVMS Integrity, it is possible that a company could be using a commercial application that is not available on OpenVMS Integrity. The upgrade decision may also be less desirable if a company would be facing a significant amount of software license fees to make the move (possibly due to not having support contracts on their applications). Despite these potential drawbacks, for many companies the upgrade will make financial and business sense thanks to the resulting savings in service costs, power costs, floor space requirements, as well as the increased performance from Integrity. Companies that plan to use OpenVMS over the long-term should seriously consider upgrading some of their systems to Integrity now. The upgrade often pays for itself in less than a year and results in significant annual savings.

TechWise Research is an independent primary market research firm that has conducted hundreds of market research studies in the computer industry. If you have any questions regarding this paper, please contact Chip Levinson at clevinson@TechWise-Research.com.

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